Best practices for designing and implementing FactoryTalk Historian Site Edition
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Introduction

This document is provided as a supplement the FactoryTalk® Historian Site Edition™ v2.20 documentation that is installed with the software. If the reader is unfamiliar with FactoryTalk Historian Site Edition, the FactoryTalk Services Platform or the Integrated Architecture, the following Product Profiles and websites should be referenced prior to this document:

FactoryTalk Historian Site Edition:
- FactoryTalk Historian Site Edition Product Profile
- http://www.rockwellautomation.com/rockwellsoftware/data/historian/ (includes ordering information)

FactoryTalk Services Platform and the Integrated Architecture:
- FactoryTalk Services Platform Product Profile

Additional related literature can also be found in the Data Management section of the Rockwell Automation Literature Library.

Document Revision History

- Revision 2.2 (06/2010): Updated to coincide with the release of Historian SE V2.20 (with new content also applicable to v2.10).
- Revision 2.1A (09/2009): Updated with revised System Limits.
- Revision 1.1 (02/2009): Updated with minor corrections for Historian SE V2.00.
- Revision 1.0 (01/2009): Initial release for Historian SE V2.00.

Using this Document

This document is intended to be a starting point and reference guide for the design of FactoryTalk Historian Site Edition systems. It is designed to make system designers and developers aware of the fundamental best-practice guidelines of FactoryTalk Historian Site Edition systems.

The FactoryTalk Historian Site Edition product is a joint-venture with OSIsoft - and while it shares many of the same features and functionality available in their Plant Information ("PI") product - the development, documentation and support of the FactoryTalk Historian Site Edition product is owned by Rockwell Software. With that in mind, references to “OSIsoft” and “PI” can occasionally be found in both the product and the documentation.

Document Naming Conventions/Abbreviations

Throughout the remainder of this document:
- FactoryTalk will often be abbreviated “FT”.
- FactoryTalk Directory will often be abbreviated “FTD”.
- FactoryTalk Live Data will often be abbreviated “FTLD”.
- FactoryTalk Historian Site Edition will often be referred to as simply “Historian SE”.

Frequently throughout this document, the user will be directed to additional Historian SE information in the form of Answer IDs (AIDs). These are technical documents created by Rockwell Automation and posted on the Rockwell
Automation Knowledgebase. Many AIDs are available to the public, however access to certain AIDs (with a padlock icon) require the elevated status of a TechConnect contract. For additional information on obtaining a TechConnect contract, contact a Rockwell Automation sales representative.

Additional FactoryTalk Historian Site Edition Documentation

The following documents should be considered related reading and are referenced throughout this document:

- FactoryTalk Historian SE Release Notes (CHM)
- Auditing the Historian Server Guide (PDF)
- FactoryTalk Historian SE Live Data Interface User's Guide (PDF)
- FTHistorian ActiveView User's Guide (PDF)
- FTHistorian DataLink User's Guide (PDF)
- FTHistorian Migration Tool User's Guide (PDF)
- FTHistorian ProcessBook User's Guide (PDF)
- FTHistorian SE Installation and Configuration Guide (PDF)
- High Availability Advanced User's Guide (PDF)
- High Availability and Replication Guide (PDF)
- High Availability User's Guide (PDF)
- Historian Buffer Subsystem User's Guide (PDF)
- Historian Server Application User's Guide (PDF)
- Historian Server Reference Guide (PDF)
- Historian Server System Management Guide (PDF)
- Introduction to Historian System Management Guide (PDF)

These documents are typically available from 2 locations:

1. pre-installation from the \Redist\Docs folder on the FactoryTalk Historian SE media
2. post-installation from C:\Program Files\Rockwell Software\FactoryTalk Historian\docs

Additional Related Documentation

The following related documents provide additional information which may be of interest:

- AID 56070 – FactoryTalk Historian SE Tips and Best Practices TOC
- FactoryTalk Security System Configuration Guide (FTSecuritySysConfig.PDF)
- RSLinx Enterprise Getting Results Guide (RSLinxEnterpriseGRG.pdf)
- Logix5000 Controllers Design Considerations
- Ethernet Design Considerations for Control System Networks
- Ethernet/IP Performance
- Integrated Architecture for Process Control Systems

These documents are typically available from 3 locations:

1. pre-installation from the Rockwell Automation Literature Library
2. post-installation from C:\Program Files\Common Files\Rockwell\Help
3. the Rockwell Automation Knowledgebase
Introduction to FactoryTalk Historian Site Edition

The FactoryTalk Historian Site Edition system collects stores and manages data from a plant or process. A typical Historian SE system consists of the following hardware and software components:

- **FactoryTalk Directory Server**: provides a central lookup service for software products participating in a FactoryTalk system. This must be a Network FTD; a Local FTD is not supported.
- **Data Sources**: the plant floor devices and instruments that generate data, typically Programmable Automation Controllers (PACs). Other Data Sources may include external databases.
- **Control System Network (CSN)**: the means of interconnecting the Data Sources, typically DeviceNet, ControlNet or Ethernet/IP.
- **FactoryTalk Live Data Server(s)**: software that communicates with the Data Sources over the Control System Network, typically RSLinx Enterprise. Other potential FactoryTalk Data Servers include RSLinx Classic, and for 3rd party Data Sources: Kepware and Matrikon. A FactoryTalk Data Server can serve data to multiple FTLD clients simultaneously (within limits). For example, FactoryTalk View SE and Historian SE are often both FTLD clients of all the Data Servers in a FactoryTalk Application.
- **Historian SE Interface(s)**: software that communicates with the Data Sources, performs exception testing, buffers the data (if the server is unavailable) and sends the data to the server for storage. In the typical Historian SE system, this will be the FactoryTalk Live Data (FTLD) interface. Other potential interfaces include OPC, Performance Monitor and OLE-DB.
- **Historian SE Server(s)**: compresses and stores the collected data and acts as a data server for Microsoft Windows-based clients applications. It is also possible to use the Historian SE Server to interact with data that is stored in external systems.
- **Historian SE Client(s)**: Microsoft Windows-based application(s) used by plant personnel to visualize the Historian SE data, choose from:
  - **FactoryTalk View Site Edition**: an ActiveX control that facilitates trending of Historian SE data inside the FactoryTalk View Site Edition Human Machine Interface (HMI).
  - **DataLink**: a Microsoft Excel Add-In that facilitates displaying, manipulating and charting/trending of Historian SE data inside Excel.
  - **ProcessBook**: a stand-alone environment for creating displays that can be published using Internet Information Services (IIS).
  - **BatchView**: facilitates the extraction of batch information from the Historian SE system.
- **Enterprise (or Business) Network**: the means of interconnecting the business computers, printers, phones, etc. Historian SE Clients may exist on this network.

For additional information on the software components, refer to the Historian SE 2.2 Introduction to Historian System Management Guide. For additional information on the hardware components, refer to Ethernet Design Considerations for Control System Networks.

What’s New in FactoryTalk Historian Site Edition V2.20?

Historian SE is a joint venture between Rockwell Software and OSIsoft. While the OSIsoft Plant Information (PI) product has been available for many years and in many releases, v2.20 is the third release of the Rockwell Software product. The v2.20 release is atypical in that it was released primarily to include FactoryTalk VantagePoint on the distribution media. However, v2.20 does include some new connectors. For more information, refer to the Release Notes.
**Known Issues**

Known issues in this release can be found in the “Known Issues” section of the Release Notes. The Release Notes are available from the Historian SE installation menu:

After a Historian SE installation to the default location, the release notes can also be found using Start > All Programs > Rockwell Software > FactoryTalk Historian > Help > FactoryTalk Historian SE Release Notes.

**FactoryTalk Historian Machine and Enterprise Editions**

FactoryTalk Historian Machine Edition™ (ME) was released in the spring of 2010 and provides Historian functionality in a module that resides in the ControlLogix chassis (1756). For more information, refer to the FactoryTalk Historian ME Product Profile.

FactoryTalk Historian Enterprise Edition™ (EE) will aggregate 2 or more FactoryTalk View Site Edition systems. For additional information on the availability of FactoryTalk Historian EE, contact a Rockwell Automation sales representative.

**FactoryTalk Historian Classic**

FactoryTalk Historian Classic™ (formerly known as RSBizware Historian) is a completely different product from Historian SE. For additional information on FactoryTalk Historian Classic, refer to the FactoryTalk Historian Classic Product Profile. Historian Classic systems can be migrated to Historian SE. For additional information, refer to the FTHistorian Migration Tool User’s Guide.
Architectural Considerations
A typical Historian SE system consists of several Windows-based computers and various PACs interconnected via one or more networks. To insure proper operation for Historian SE, these ‘foundation’ components of the system must be operating properly:

- The PACs must be properly programmed and configured for efficient communications. For example: the processor's communications time slice may need to be increased.
- The network(s) must robust and free of communications errors and bottlenecks. For example, the ports on switches and the network interface cards on computers should typically changed from ‘Auto Detect’ to a fixed setting.
- The computers must be configured appropriately for the application. For example, power saving features on servers should typically be disabled. Firewalls may need to be turned off, or configured with exceptions.

For additional information on these topics, refer to Ethernet Design Considerations for Control System Networks.

Recommended Platform Requirements

Operating System Tips
- Historian SE v2.20 ships with FTSP CPR9 SR1 and therefore does not support Windows Server 2008, Windows Vista or Windows 7. Support for these operating systems is planned for the next release. For the latest information about the software platforms supported by Historian SE, refer to AID 42682 - Supported Platform/Hardware Compatibility Matrix.
- It is highly recommended that all Historian SE computers with a ‘server’ role use a server OS (i.e., the Historian SE Server, FactoryTalk Directory Server and the Live Data Server). Workstation operating systems like Windows XP and 2000 Pro should be avoided in the production environment. (they have a 10 connection limit)
- Historian SE is tested and supported on operating systems installed from original Microsoft media only. Using OEM operating systems (e.g., Dell, HP) is not recommended.
- As a general rule, servers and clients should be in the same Windows OS ‘vintage’. For example, Windows 2000 clients should not be used with Windows 2003 (or Windows XP) ‘servers’. The combination of Windows XP SP2 ‘servers' and Windows 2000 Professional SP4 clients has been problematic with both Rockwell Software and third-party products.
- It is highly recommended that Microsoft’s OS patches be applied to all computers in a Historian SE system, however, only qualified Microsoft patches should be applied. For more information, refer to the Rockwell Automation Microsoft Patch Qualification web site.

Virtual Environments
Support for Virtualization in production environments using VMware was announced in the fall of 2009, for additional information refer to AID 30209 - Rockwell Software in Virtual Environments.

Note: Support for Historian SE in the Marathon EverRun FT environment is imminent, but does not exist at this time. To be notified that support is available, subscribe to update notifications for AID 30209.
Architectural Best Practices

A typical Historian SE system consists of the following software components (or roles) distributed across multiple host computers:

1. Network FactoryTalk Directory Server
2. FT Live Data Server(s)
3. Historian SE Interface(s)
4. Historian SE Server(s)
5. Historian SE Client(s)

These five components result in a relatively large number of potential architectures. For example, consider a small distributed system consisting of the following components:

1. Network FTD (1)
2. FT Live Data Server (1)
3. Historian SE Interface (1)
4. Historian SE Server (1)
5. Historian SE Clients (2)

Using a dedicated computer for each component, this system could be deployed with six computers. It can also be deployed several ways using only two computers. Here are just two architectural examples using only two computers:

- Architecture #1
  - Computer #1 = Network FTD, FT Live Data Server, Historian SE Interface, Historian SE Server, Historian SE Client #1
  - Computer #2 = Client #2

- Architecture #2
  - Computer #1 = Network FTD, Historian SE Server, Historian SE Client #1
  - Computer #2 = FT Live Data Server, Historian SE Interface, Historian SE Client #2

The problem with both of these architectures is the lack of server-client autonomy. It is highly recommended that server and client roles be hosted on separate computers. Servers are typically located in a secured, environmentally controlled area and clients are typically in a control room or on the plant floor. With this philosophy in mind, a preferred architecture for this example would be:

- Computer #1 = Network FTD, Historian SE Server, Historian SE Interface, FT Live Data Server
- Computer #2 = Historian SE Client #1
- Computer #3 = Historian SE Client #2

Using this architecture requires an additional computer, but the additional hardware cost is typically more than offset by increased system usability and maintainability. However, in order to take advantage of the Historian SE’s buffering capability, it is also highly recommended that the Historian SE Server be hosted on a computer separate from the Historian SE Interface. Therefore, the ideal solution for this five component distributed system would consist of four computers:

1. Computer #1 = Network FTD, Historian SE Server
2. Computer #2 = Historian SE Interface, FT Live Data Server
3. Computer #3 = Historian SE Client #1  
4. Computer #4 = Historian SE Client #2

**Use with Third Party Devices**
Like all FactoryTalk Applications, Historian SE supports both Allen-Bradley PACs and Third Party PACs. For more information on using Historian SE with Third Party PACs, refer to [AID 65406 - Using FactoryTalk Applications with Third Party Devices](#).

**Use with FactoryTalk VantagePoint**
FactoryTalk VantagePoint is a web based reporting alternative for both ProcessBook and DataLink. For more information on using FT VantagePoint with Historian SE, refer to [AID 62869 - Using FactoryTalk Historian and FactoryTalk VantagePoint on a single host computer](#) and [AID 68720 - Updated FactoryTalk Activation is required for using FactoryTalk VantagePoint with FactoryTalk Historian SE v2.20](#).

**Use with OSI PI**
Support for using FactoryTalk Historian with OSI PI is limited. For more information, refer to [58662 - Using FactoryTalk Historian SE and the OSI PltOPI Interface](#).

**System Limits**
Historian SE licenses are available in the following counts for both Live Data and 3rd Party tags:

- 500; 1,000; 2,500; 5,000; 10,000; 20,000; 50,000; 100,000

A 250 tag Live Data only license is also available.

The licenses are additive, so to support 7,500 Live Data tags, licenses for 5,000 + 2,500 tags, or a single license for 10,000 tags, could be purchased. To support Server High Availability (i.e., a collective), quantity 2 of each license must be purchased. There are no additional licenses required for FTLD Interface Node redundancy.

To design and configure a non-redundant Historian SE system successfully, also observe the following limits:

- The maximum number of Historian SE Servers in a FactoryTalk System = 1
- The maximum number of FTLD Interface Nodes per Historian SE server = 20 - or - 50,000 Archived Events at the Server/sec, whichever occurs first.
- The maximum events per second on the FTLD Interface (for Advised and Polled tags) = 20,000

To design and configure a redundant Historian SE system successfully, also observe the following limits:

- The maximum number of Collectives in a FactoryTalk System = 1, where the maximum number of Servers in the Collective = 2
- The maximum number of redundant FTLD Interface Nodes per Historian SE server = 10 pairs - or - 50,000 Archived Events at the Server/sec, whichever occurs first.
- The maximum events per second on the redundant FTLD Interface (for Advised and Polled tags) = 15,000

The following the limits apply to all systems:

- The maximum number of tags per system =100,000 (e.g., 100,000 Live Data or 75,000 Live Data & 25,000 3rd Party)
- The maximum number of Clients that can have simultaneous access to a Historian SE Server = 20
- The maximum number of FTLD Interfaces on one computer = 1
- Maximum events/sec to the FTHSE Archive = 50,000

**Internet Information Server (IIS)**

Internet Information Server (IIS) is a required component only for a computer hosting ProcessBook displays. If ProcessBook is being used, then the IIS host may be the Historian server, or it may be a separate, dedicated web server. IIS is not required (and not recommended) for any other Historian SE computers (e.g., Live Data Servers, Interface nodes, clients, etc).

**Workgroup vs. Domain**

Historian SE is supported in both domain and workgroup environments, within limits. For more information, refer to the FTSP Help and select ‘Guidelines for Windows Workgroups and Domains’.

**Domain Best Practices**

Extensive information on Microsoft domains is beyond the scope of this document, however there are some key points that users of a Historian SE system in a Windows Domain should understand:

- Historian SE v2.20 supports the following Microsoft domain environments:
  - Windows Server 2008 Active Directory (in any functional level)
  - Windows Server 2003 Active Directory (in any functional level)
  - Windows 2000 Server Active Directory (in Native or Mixed mode)

  **Note:** Windows 2000 Active Directory (AD) domains introduced the concept of a “forest.” A forest can consist of a single “domain tree”, or multiple domain trees. A domain tree can consist of a single domain (a.k.a. the “parent” domain) or multiple domains (a.k.a. the “child” domains). We recommend a single forest, single tree, and single domain configuration. In Windows Server 2003 Active Directory, both domains and forests have individual functional levels. We recommend the default functional levels:
    - Domain: Windows 2000 mixed
    - Forest: Windows 2000

  To determine the Windows 2000 domain mode, launch Active Directory "Domains and Trusts" (Start > Programs > Administrative Tools), right-click the domain and select "Properties". To determine the Windows 2003 functional levels, the identical procedure is used.

- Choose internal Microsoft Active Directory domain names carefully. An internal Microsoft Active Directory domain name should not be confused with an Internet (external) domain name, and while they can be the same name, typically they are not. The company’s IT department or the [Microsoft Best Practice Active Directory Deployment](#) should be consulted for additional information.

- Domain Controller Redundancy:
  - At least 2 domain controllers are recommended, where both are configured with the Global Catalog (GC) role to provide high availability. By default, the GC role is only on the first domain controller in the forest, but it’s possible to add the GC role on other domain controllers from the Active Directory Sites and Services console. Simply expand Sites > site name > Servers > server name, right-click NTDS Settings, and select Properties. The Global Catalog check box is on the General tab. **Note:**
There are still a number of single instance domain controller roles that can result in a single point of failure. These 5 Flexible Single Master Operations (FSMO) roles are:

1. PDC Emulator (one per domain)
2. Infrastructure master (one per domain)
3. Relative ID (RID) master (one per domain)
4. Schema master (one per forest)
5. Domain naming master (one per forest)

- Time synchronization should be configured throughout the domain. For additional information, refer to the section entitled Time Synchronization later in this document.
- Prior to deploying Historian SE, both new and existing active directory domains should have their operation verified using Microsoft's Domain Controller Diagnostics (Dcdiag.exe) utility. This utility is included with the Windows Support Tools located on the Operating System CD and also available via download from Microsoft.
- Rockwell Software does not support its software on computers configured as domain controllers. The following information comes from a Microsoft TechNet article posted at http://www.microsoft.com/technet/prodtechnol/windows2000serv/maintain/security/secdefs.mspx. The key sentence in this TechNote is "In general, Microsoft does not recommend running applications on computers configured as domain controllers, and certainly not applications that require more than Authenticated User privileges in order to run successfully." Installation of any application software on a domain controller can have adverse affects on the network and is the responsibility of the user to accept the risk.

Windows Support Tools

Microsoft provides many supplemental diagnostic tools and utilities known collectively as the Windows Support Tools. These tools can be very helpful for verifying and troubleshooting Ethernet networks, Domain Controllers and Active Directory. However, these tools must be installed manually after the initial installation of the operating system. For additional information, refer to http://technet.microsoft.com/en-us/library/cc758202.aspx.

Software Installation

Typically, one of two scenarios will exist when preparing to install Historian SE:

1. A FactoryTalk system must be designed and created
2. A pre-existing FactoryTalk system already exists and integration is required

In either scenario, refer to Chapter 2 of the Historian SE Installation and Configuration Guide for specific guidelines. Additionally, keep the following recommendations in mind:

- Establish a system’s computer names prior to installing the FactoryTalk Services Platform and Historian SE. Changing computer names after the installation of the software is not recommended.
- Check the time and the time zone on all computers prior to installing the Historian SE server. It is very important that the time zone settings are not changed after the product is installed. To maintain accurate time on all computers, use the Windows Time Service.

When integrating into a pre-existing FactoryTalk system:

- Historian SE requires FactoryTalk Services Platform (FTSP) v2.20.00 (CPR9) or higher. With pre-existing FT systems, this may require a system-wide FT upgrade. To determine the version of FTSP a system is
using, refer to AID 25612 – How to Determine the version of the FactoryTalk Services Platform (FTSP) installed on your computers.

- Historian SE’s installation makes some assumptions that are atypical, for additional information refer to AID 48727 - Things you should know about integrating into a pre-existing FactoryTalk v2.20 (CPR9) Environment.

**Default File Locations for FactoryTalk Historian SE**

**Core program files:**
C:\Program Files\Rockwell Software\FactoryTalk Historian

**Database files:**
C:\Program Files\Rockwell Software\FactoryTalk Historian\Server\PL\Dat

**Help files and additional documentation:**
C:\Program Files\ Rockwell Software\FactoryTalk Historian\docs

**Network FactoryTalk Directory File:**
C:\Documents and Settings\All Users\Application Data\Rockwell\RNAServer\Global\ApplicationName.RnaD

**Post-Release Patches**

No v2.20 post-release patches existed when this document was released (06/2010). Search the Rockwell Automation Knowledgebase for any new v2.20 patches.

**Post-Installation Activities**

The following tasks should be performed immediately after installation, and prior to considering the system ‘commissioned’ and ready for collecting production data.

**Activation**

Historian SE only supports FactoryTalk Activation™; Rockwell Software’s legacy (EvRSI) activation is not supported. For additional information on FactoryTalk Activation, refer to:

- the FactoryTalk Historian SE Installation and Configuration Guide: Chapter 3 - Activation
- the FactoryTalk Activation On-line Help
- AID 68720 - Updated FactoryTalk Activation is required for using FactoryTalk VantagePoint with FactoryTalk Historian SE v2.20
- AID 60530 - FactoryTalk Historian SE v2.1 (CPR9 SR1) Activation FAQ
- AID 35251 - FactoryTalk Activation Frequently Asked Questions
- AID 44623 - What Videos are available on FactoryTalk Activation?
- AID 35717 - How to make communication available between the FactoryTalk Activation Server and Client

If planning to deploy a FactoryTalk Activation Server, refer to:

- AID 35376 - FactoryTalk Activation Server User Management
- AID 41573 - FactoryTalk Activation End User Options File to Include/Exclude Borrowing Activations
- AID 35708 - How to support FactoryTalk Activations in a LAN/WAN Environment
Create and Configure a FactoryTalk Application
In a pre-existing FT environment, the FT Application may already exist, but additional configuration may be required to support Historian SE. For example, an existing FT View SE installation will always have an existing FT Application. However, an existing FT Historian SE installation may or may not have an existing FT Application. In a new FT environment, the FT Application must be created to support Historian SE. In both cases, configuration is accomplished using the FT Administration Console. Additional Historian SE Server and Interface configuration is performed using the System Management Tools (SMT) and the Interface Configuration Utility (ICU). For additional information, refer to the Historian SE online help.

Create and Configure Data Servers and Verify Communications
At least one Data Server must exist in the FT Application in order to communicate with the PACs. In a pre-existing FT environment, existing Data Servers will typically be leveraged. In a new FT environment, the Data Servers must be created. For additional information, refer to the Historian SE online help.

To configure an RSLinx Enterprise Data Server, use the FT Administration Console to:
1. Create an area. For additional information, refer to the Controller Communications section of this document.
2. Create a Rockwell Automation Device Server (RSLinx Enterprise). For additional information, refer to the Historian SE online help or refer to the RSLinx Enterprise Getting Results Guide.
3. Configure and verify RSLE shortcut(s) to the PAC(s). For additional information, refer to the Historian SE online help or refer to the RSLinx Enterprise Getting Results Guide.

To configure an RSLinx Classic and/or 3rd Party OPC Server, use the FT Administration Console to:
1. Create an area. For additional information, refer to the Controller Communications section of this document.
2. Create an OPC Data Server. For additional information, refer to the Historian SE online help.
3. Configure and verify the Data Server’s shortcut(s) to the PAC(s). For additional information, refer to the OPC Server’s documentation.

To test and troubleshoot a FactoryTalk Application (i.e., the Data Servers), consider using the Rockwell Software Data Client. This utility is located at Start > All Programs > Rockwell Software > FactoryTalk Tools > Rockwell Software Data Client. For additional information, refer to the online help.

Create and Configure a Historian SE Server and FT Live Data Interface
To create and configure a Historian SE Server and FT Live Data Interface, use the FT Administration console to run the New Historian Server Connection Wizard. For additional information, refer to the Historian SE online help and AID 52867 - Things you should know about the 'New Historian Server Connection' wizard.

After successful creation of the server, the Discovery New Historian Points Wizard will run automatically. Depending on the system configuration, this may not be appropriate. For additional information, refer to AID 47732 - Things you should know about the 'Discover New Historian Points' wizard.

Configure Server Licensing
After creating the Historian server, licenses must be assigned. For more information, refer to the FT Administration console online help.
Configure and Test Buffering on all Interface Nodes
If a FactoryTalk Live Data or 3rd Party Interface is located on a host separate from the Historian SE Server, the PI Buffer Subsystem should be enabled (API buffering is not supported). The PI Buffer Subsystem is enabled and configured using the Interface Configuration Utility (ICU). For additional information, refer to AID 56721 - Things you should know about FactoryTalk Historian SE Buffering or the ICU online help or the Historian Buffer Subsystem User's Guide.

The default buffer file location may also need to be changed. For additional information, refer to AID 65563 - Changing the location of the PIBUFSS Event Queue or the Historian Buffer Subsystem User's Guide.

Configure and Test Redundant Interface Nodes
If a FactoryTalk Live Data or any of the 3rd Party Interfaces will be redundant, the Interface Configuration Utility (ICU) must be used to configure the redundancy. For additional information, refer to AID 59354 - FactoryTalk Historian SE - Things you should know about using the Administration Console with Redundant Interfaces and Collectives or the ICU online help or the Historian Server System Management Guide.

Convert Advised Points to Polled or Output Points
The default point type is Advised. This is the most commonly used (and most efficient) point, but in some applications Polled and/or Output Points may be required. For more information, refer to AID 51765 - Location definitions for the FactoryTalk Live Data Interface.

Configure Archiving on the Historian Server
The default archiving configuration should be reviewed and modified for system and site specific needs. For example, the default archive size of 128MB should typically be increased. For more information, refer to AID 61617 - How to change the automatically created archive file size in FactoryTalk Historian SE.

The default archive location may also need to be changed. For additional information, refer to AID 49538 - Relocating the FactoryTalk Historian SE Database to a Different Drive or the Introduction to Historian System Management Guide.

Enable Disconnected Startup
Disconnected Startup is a feature that allows a remote FTLD Interface to start from a local cache file with or without a valid connection to the host Historian Server. This critical functionality prevents data loss when an interface needs to start up and it does not have a connection to the Historian Server. Disconnected startup also provides the added benefit of faster Interface startups (even with a valid connection the Historian Server). For more information, refer to 66883 - Things You should know about FTLD Interface Disconnected Startup.

Configure Automated Shutdown
To avoid the potential of archive corruption, the Historian Server should always be shutdown gracefully prior to the Windows OS. To automate this process, use Window's Local Policy. For more information, refer to 48286 - How do I perform a graceful shutdown of a FactoryTalk Historian server?
**Windows Error Reporting**
There is an error reporting feature included with Windows XP and Windows Server 2003 that can be used to report computer and program errors to Microsoft. For additional information refer to AID 42651- Instructions for disabling the Windows Error Reporting feature.

**Disable Virus Scanning on the Archive Directory**
Any virus scanning software should be configured to bypass the archive directory to prevent corruption and prevent performance degradation.

**Consider Implementing the Audit Viewer**
The Historian Server includes two independent mechanisms that record extensive audit records. These mechanisms record the data that is added, edited, or removed from specific Historian Server database files, as well as other events or changes to configurations that occur in the Historian Server. For more information, refer to AID 64384 - FactoryTalk Historian Site Edition AuditViewer.

**Monitor the Server using Performance Points**
To monitor the health and performance of the Historian SE Server, consider using the Performance Monitor interface and the associated 140 ‘PerfMon’ tags. For additional information, refer to AID 59015 - Things you should know about the new Performance Points and their use with the PerfMon Basic Interface. If the ProcessBook client has been purchased, consider using the Server Overview Display. For additional information, refer to AID 58486 - Using ProcessBook to Monitor the Status of a FactoryTalk Historian Site Edition v2.2 Server.

**Perform Reboot Tests**
To ensure that all servers, interfaces and data servers in the system will function properly after a reboot, testing should be performed. For additional information, refer to AID 38087 – Recommended Startup Procedure for FactoryTalk Distributed Architectures.

**Test Client Connectivity and Data Access**
Client installation is currently beyond the scope of this document. However, client connectivity should be tested when the previous steps have all been completed successfully.

**Configure Shutdown Script on the Historian Server**
To prevent data corruption, the Historian Server services should always be shutdown in an orderly fashion prior to rebooting the Historian Server. This can be performed manually using Start > All Programs > Rockwell Software > FactoryTalk Historian > Stop FT Historian system. However, since this manual step is easily forgotten, configuring Windows to perform this step automatically is highly recommended. For additional information, refer to AID 48286 – How do I perform a graceful shutdown of a FactoryTalk Historian Server?

**Configure and Test Backups**
Back-up the FactoryTalk Application using the FT Administration Console. For additional information, refer to the FT Administration Console online help. Additionally, configure and run a Historian SE backup using the Backup Subsystem. For additional information, refer to the Introduction PI System Management Guide.
**Anticipate Long Term Storage Requirements**

For more information, refer to AID 50472 - Estimating disk space usage for FactoryTalk Historian SE.

**Manage the System**

To proactively monitor all computers in the system, consider augmenting the system with:

- a third party Network and System Management System. For additional information, refer to AID 38056 – Network and Systems Management for FactoryTalk Distributed Architectures.

**Performance Considerations**

The overall performance of a Historian SE system must be considered from two perspectives:

1. Data Acquisition
2. Data Reporting

Data Acquisition performance is influenced by a variety of system elements on the collection side, typically:

- Data Source
- Control System Network
- FT Live Data Server
- Historian SE Interface
- Historian SE Server
- system design and configuration
- system maintenance

When designing a system, the designer must consider all of these elements. If even one element is ignored, this may result in a performance bottleneck. For example, if the data source is located on a “slow” network link, the ability to collect data at a relatively high frequency will be affected, regardless of the hardware used for the Historian SE Server.

Data Reporting performance is typically influenced by a slightly different set of system elements:

- Site Business Network
- Historian SE Server
- Historian SE Client
- system design and configuration
- system maintenance

Once again, the system designer must consider all of these elements when designing the system. If even one element is ignored, this may result in a performance bottleneck. For example, if the Historian SE Client is located on a “slow” Site Business Network link (e.g., a WAN link), the ability to display data at a relatively high frequency will be affected, regardless of the hardware used for the Historian SE Server.

For more performance related information, refer to the following product documentation:

- Data Source: Logix5000 Controllers Design Considerations
- Control System Network: Ethernet Design Considerations for Control System Networks
Interfacing with Other Databases

The Historian SE Server can exchange data with other disparate databases, for more information refer to AID 56861 - Interfacing FactoryTalk Historian SE with other databases.

Redundancy and High Availability

Redundancy requirements are unique to each application. A complete redundant solution consists of a primary and secondary for every component: computer hardware, software, network hardware, PACs, etc. In practice, this is seldom feasible or even necessary.

The term ‘redundancy’ with Historian SE applies to only data collection (i.e., the Interface node). Configuring the Historian Servers for redundancy is known as ‘High Availability’ or a ‘Collective’ and applies to reporting. In release 2.2, both Interface Redundancy and Server High Availability are supported. For more information refer to AID 59354 - FactoryTalk Historian SE - Things you should know about using the Administration Console with Redundant Interfaces and Collectives.

Before setting up Interface Redundancy and Server High Availability, plan:

- Which components in the system require redundancy?
- What software components on computers require backup systems?
- What is the network layout of the components within the system?
- What is the CPU processing load that is expected for each computer?

Note: The FactoryTalk Directory server does not require configuration for redundancy. The FactoryTalk Directory information is cached on each computer that is participating in a distributed application. If the FactoryTalk Directory server computer is disconnected from the network or fails, each Historian SE client in the application can continue to access the Historian SE Server(s) in the application as long as the computer had previously accessed the FactoryTalk Directory server. However, since the FactoryTalk Directory is required to edit the application, it is recommended to place the FactoryTalk Directory on a computer with high availability.

Controller Communications

RSLinx Classic (RSLC) and RSLinx Enterprise (RSLE) can both communicate with SLC/PLC/CLX controllers. However, RSLE is the preferred method of communications for Historian SE unless one of the following features of RSLC is needed.

- OPC/DDE Server to non-FactoryTalk applications (RSLE can provide OPC, but requires FactoryTalk Gateway)
- Alias Topic Functionality
- Unsolicited Messaging
- Complex communication routing. Protocol changing (ex. Ethernet to DH+)

RSLC and RSLE can also co-exist on the same computer at the same time (refer to Appendix C of the RSLE Getting Results Guide for additional information).
When designing an application, do not duplicate references to Live Data Servers (RSLC, RSLE and 3rd Party OPC Servers) in the application. Tags from a single Live Data Server may be referenced from any HMI project in any area of the application; therefore, it is recommended to place only one Live Data Server per Area. If a particular physical area in the plant has more than one Live Data Server (RSLinx for Rockwell controllers and Kepware for a 3rd party controller, for example), create logical “sub-Areas” to separate the two as illustrated below:

For additional information, refer to AID 29663 - View SE Area Best Practices.

When planning communications:

- Gather information about the types of controllers or devices in the plant, and the software that is available for communicating with them.
- Determine how the programmable controllers on the network will communicate with the application. This will help plan the number of Live Data Servers needed in the application.
- Determine how the application will access data in the controllers or devices. In most instances, the values in controllers or devices can be directly referenced without needing to create an HMI tag.

For certain special instances however, the need to set up an HMI tag database may exist. HMI tags provide extended capabilities, such as:

- Triggering alarms when tag values cross a specified threshold.
- Scaling or offsetting a value before sending it to a programmable controller or device.
- Security

Live Data Servers allows clients to access information in programmable controllers, devices and other Live Data Servers that comply with the OPC-DA 2.2 specification.
**Live Data: TCP/IP or DCOM**

FactoryTalk System Policy now allows a choice of Live Data protocol. This policy setting affects communications between client and server services and between the FactoryTalk directory and servers on the network. This setting is considered a "default" because if the FactoryTalk Live Data service detects that some components on the network are not compatible with the selected policy setting, it overrides the policy and uses whichever setting is most likely to ensure uninterrupted communications. For example, for third-party servers and RSLinx Classic, FactoryTalk Live Data will not attempt a TCP/IP connection and will always use DCOM.

The FactoryTalk Services Platform installation process evaluates the services and components on a network and sets the communication protocol appropriately. For example, if upgrading from an earlier version of the FactoryTalk platform to FactoryTalk Services Platform 2.20 (CPR 9) or later, the communications default is automatically set to DCOM. If installing FactoryTalk Services Platform 2.20 or later for the first time on a computer, the communications default is automatically set to TCP/IP. Typically, it is not necessary or advisable to change the default setting. Refer to the FactoryTalk online help for additional information.

**RSLinx Enterprise Predefined Items**

RSLinx Enterprise Predefined Items are internal counters and strings that are made available as data items (tags) for diagnostic purposes. These items differ from regular data items in that they access internal information contained in RSLinx Enterprise. The referenced technote below includes two View SE graphics containing RSLinx Enterprise diagnostics counters. One graphic contains counters that can be used with ControlLogix family controllers and the other one contains counters that can be used with PLC-5, SLC, and MicroLogix family of controllers. These graphics will import into a View ME or SE project. Refer to [AID 30148 - Using RSLinx Enterprise Diagnostic Counters - Predefined items](AID 30148 - Using RSLinx Enterprise Diagnostic Counters - Predefined items)

**How many tags can RSLinx poll in a given amount of time?**

There is no straightforward answer to this question. There are many factors involved, some of which are:

- **The computer hardware that the Live Data Server (RSLinx Classic or Enterprise) is running on.** The more memory and the faster the processor, the better.
- **Additional CPU loading from other software running on the same computer.** Even if the multiple software products are compatible to run on the same PC, it is possible to negatively impact performance by having them fight for computer resources. Use Task Manager or Perfmon to monitor for resource hogs. Those software packages may need to be moved to another computer to improve the overall performance.
- **The network the data will be polled over (Ethernet, ControlNet, DH+, DH-485, Serial, Dial-up, etc.).** There are physical and practical limits to how much data a network can transmit. Additional research may be needed for specific designs.
- **The number of controllers the Live Data Server will need to communicate with.** Just as in conversations, it is easier and more productive for one person to call another person to receive a lot of information, as opposed to the same person calling fifty different people for only a little bit of information each. That is one reason why a data concentrator controller may be beneficial or needed.
- **The type of controllers.** Some of the newer Logix brand controllers have been developed with networking optimization in mind and therefore perform better than others.
- **How the controller program is written.** Are the tags or data points optimized in the controller to be in consecutive blocks or are they scattered randomly throughout the controller? Are they in arrays?
• **How the controller is configured.** In the Logix family of controllers, a programmer has the ability to tune the communication time slice. This setting only applies to the continuous task in a project. The background task uses the remaining time after running the periodic tasks and any motion task. This determines how much time is used for communication processing. Be sure not to increase this value so much that it impacts the scan time of the controller’s program. Refer to [AID 25915 - Setting the Overhead Time Slice or Increasing Processor Bandwidth for Comms](#).

**RSLinx Classic vs. RSLinx Enterprise vs. 3rd Party OPC**

RSLinx Enterprise:
- RSLinx Enterprise is optimized to provide the best performance for large numbers of clients (more than 10), and large number of tags (more than 10,000), even if located on the same computer as the Historian SE Server.
- Can communicate with SLC/PLC/CLX controllers (excluding PLC-2, PLC-3 and PLC-5/250).
- Can serve OPC data with the addition of FactoryTalk Gateway.
- Preferred Historian SE Live Data Server to Rockwell controllers.

RSLinx Classic:
- On applications containing more than 10,000 active tags on scan, may require its own dedicated host computer. This is dependent on hardware performance.
- When using Alias Topics, never use “Switch on Error” when communicating to ControlLogix processors. [AID 26228 - Using RSLinx Alias Topic "Switch On Error" and "Switch On Command"](#).
- Can communicate with SLC/PLC/CLX controllers (including PLC-2, PLC-3 and PLC-5/250)
- Can serve OPC data.
- RSLinx connections to processors on an Ethernet network. [AID 7480 - RSLinx; Ethernet Networks; Problems and Solutions](#).

3rd Party OPC servers
- For applications containing more than 10,000 active tags on scan, may require its own dedicated host computer. This is dependent on hardware performance.

**FactoryTalk Gateway**
- FactoryTalk Gateway is an OPC server that enables OPC clients to connect to FactoryTalk applications that contain RSLinx Enterprise and Historian SE servers. By doing so, they can access tag data within those applications.
- It is OPC Version 2.25 compatible.
- FactoryTalk Gateway Distributed is for FactoryTalk network applications.
- Only one FactoryTalk Gateway can be installed per computer.
- Multiple FactoryTalk Gateways can point to a single FactoryTalk application.
- FactoryTalk Gateway can only point to a single FactoryTalk application at a time.
- FactoryTalk Gateway can communicate to as many unique tags as licensed.
- 20 remote OPC clients have been formally tested and validated against FactoryTalk Gateway.
RSLinx Classic with a Logix Controller
Please be aware that there are known issues when online editing or downloading to a Logix Controller, particularly when RSLinx Classic is being used as the Live Data Server. If a client application requests tag data, RSLinx Classic will group the tags into packets, and put these packets on scan with the controller(s). If an online edit or download causes a change to the controller’s data table for a data packet on scan, the packet may need to be taken off scan, and put back on scan for the changes to be reflected.

Many of these issues have been addressed with RSLinx Enterprise, which was designed specifically for the Logix family of controllers, and why RSLinx Enterprise is the recommended Live Data Server for this platform.

RSLinx Classic was originally designed for the structured data tables of the SLC and PLC product lines. The Logix platform introduced new communication and memory performance parameters that can affect RSLinx Classic. For this reason, RSLinx Enterprise was designed to be the preferred communication server for the Logix platform. Please consult the local Rockwell account representative for a complete comparison.

AID 30605 - Runtime Editing with RSLinx Classic and Logix Processors

System Security
Security threats to a Process Control System generally fall into 4 categories: external, internal, intentional and accidental. Detailed security recommendations against external threats are beyond the scope of this document. However, there are some basic measures that should be taken to protect against the most common threat – the day-to-day users of the system. Recommendations in this area include:

- Password protect the computer’s BIOS: to prevent booting from anything other than the local hard drive, configure the computer to boot only from the hard drive, and then configure a BIOS password so that mischievous users cannot change the boot device
- Password protect the local Administrator account: this often overlooked task is critical
- Configure the Windows environment so that it is “strictly business” for the operators: restrict access to required applications only using Group Policy (in a domain) or Local Policy (on an individual machine or workgroup). Rockwell Software’s DeskLock can also be used for this purpose.

FactoryTalk Security
FactoryTalk Security authenticates user identities and authorizes user requests to access a FactoryTalk-enabled system. These security services are fully integrated into the FactoryTalk Directory and are included as part of the FactoryTalk Services Platform. FactoryTalk Security includes user authentication that determines who can open, create, modify, and delete application components, and on which computers the actions are allowed. It is also possible to use FactoryTalk Security to add user and group security accounts as well as Windows-linked accounts, and set up security for common actions such as tag writes, open, and delete.

Possible uses of FactoryTalk Security include:
- Preventing writes to specified tags from the Historian SE Client.
- Preventing access to specified displays from the Historian SE Client.
- Preventing access to specified commands from the Historian SE Client.
- Preventing changes to the application from FactoryTalk View Studio or the Administration Console.

For more information, refer to the FactoryTalk Security System Configuration Guide.
Windows Terminal Services

Historian SE fully supports Windows Server 2003 Terminal Services, refer to technical notes AID 29919 - Using View SE with Windows 2003 Terminal Services. While the focus of this document is View SE, it is also applicable to Historian SE.

- Terminal Services is a standard feature built into the Windows Server family (Server, Advanced Server, and Datacenter Server) which provides remote access to servers from practically anywhere in an enterprise. It is a transparent system that runs applications and performs data processing and storage functions on the server computer to minimize the amount of information traveling across a network. While multiple sessions run on a single server, each user can only refer to their individual session. Users’ desktops are transmitted to clients for display using terminal emulation software. Similarly, the software sends print streams and command functions such as keyboard inputs and mouse clicks across the network between the client and the server.

- For a computer to be a Terminal Services client, it only requires an operating system and the Terminal Services client software. No other software (not even a web browser) is required. For this reason, these clients are known as “thin” clients.

- Since minimal software is needed on the client computer and all the processing is done on the server, client computer hardware can be scaled down to reduce cost.

Time Synchronization

The Windows Time service (W32tm.exe) uses the Network Time Protocol (NTP) to synchronize computer clocks on the network. Time synchronization is critical for the proper operation of many Windows services and to ensure the security of Kerberos authentication within an Active Directory environment. In a Historian SE distributed system, time synchronization ensures accurate time stamps on data, alarms and diagnostic logs. Therefore, configuring time synchronization is highly recommended.

- In workgroup environments, configure Windows Time to synchronize all the SE computer clocks to an authoritative time server (e.g. the FactoryTalk Directory).

- In domain environments, Windows Time should be automatically configured on each computer (when they join the domain) for the appropriate authoritative time server (i.e., the domain controller that is also the PDC emulator).

- In either environment, the authoritative time server should then be synched to:
  - a reliable time server on the Internet
  - a locally-connected hardware time source such as an atomic clock

- Check the Event Viewer System log of each computer to verify that the time is being updated properly.

Windows Time Service Tools and Settings
http://technet2.microsoft.com/windowsserver/en/library/b43a025f-cce2-4c82-b3ea-3b95d482db3a1033.mspx?mfr=true

Administering the Windows Time Service
http://technet2.microsoft.com/WindowsServer/en/library/ac86e77c-0be3-430a-ba0b-c2225506fc4f1033.mspx?mfr=true

How to configure an authoritative time server in Windows Server 2003
http://support.microsoft.com/kb/816042
How to configure an authoritative time server in Windows XP
http://support.microsoft.com/kb/314054/

How to configure an authoritative time server in Windows 2000
http://support.microsoft.com/kb/216734/

Tools and Utilities

- AID 30393 - Patch File Validator Utility
- AID 30148 - Using RSLinx Enterprise Diagnostic Counters - Predefined items
- AID 30498 - Windows Firewall Configuration Utility for Windows XP Service Pack 2
- AID 20697 - Troubleshooting a Windows Network
- AID 31073 - Tool for collecting Event log files

Additional Reference Links

General

- AID 35330 - Rockwell Software Products and Antivirus Software
- AID 42682 - Software Platform\Hardware Compatibility Matrix
- AID 20440 - Compatibility Matrix of RSI/AB software on Windows XP Pro
- AID 28293 - Compatibility Matrix of RSI/AB software on Windows XP Pro Service Pack 2
- AID 27743 - RSI Products and Intel Hyper-Threading Technology

Communications

- AID 22199 - RSLinx Classic Service Pack/Hotfix TOC
- AID 37285 - RSLinx Enterprise 5.00.00 Patch TOC
- AID 26464 - RSLinx Internals: OPC/DCOM timeouts when a remote client is disconnected

ControlLogix

- ControlLogix Redundancy System User's Guide
- ControlLogix Data Collection with RSLinx
  http://www.software.rockwell.com/download/comms/rslinx/clx_perf.zip
- Logix 5000 Controllers Design Considerations

Microsoft

- Microsoft TechNet article on Domain Controllers
- How To Register an ActiveX Control (.ocx) Manually
- Microsoft’s Description of Performance Options in Windows
- Log Parser